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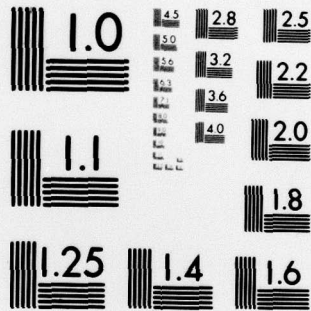
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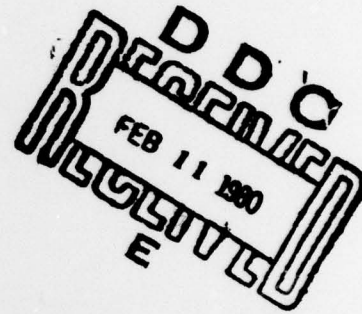
Polymer Attached Catalysts

FINAL REPORT

1 Mar - 31 Aug 79

Robert H. Grubbs

7 January 1980



U. S. Army Research Office

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California Institute of Technology  
Pasadena, California 91125

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ABSTRACT (contd)

composits were evaluated as oxidation catalysts and as electrode coatings.

PUBLICATIONS (from DOD support)

S. C. H. Su and R. H. Grubbs, "Enzymic and Non-Enzymic Catalysis," Plenum Press, in press.

R. H. Grubbs, S. C. H. Su, and S. Swetnick, Report No. 281, Du Centre Nat. de la Recherche Scientifique, CNRS, 1979.

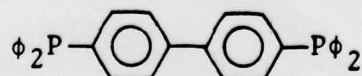
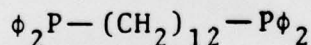
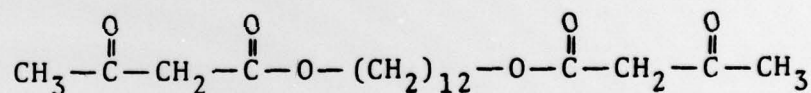
SCIENTIFIC PERSONNEL

Gwen Goretsas - M.S. student

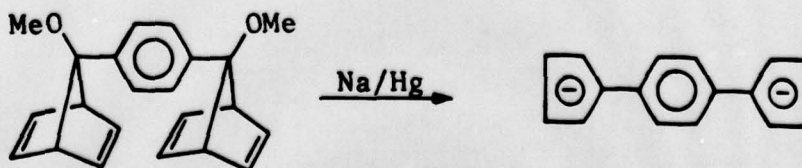
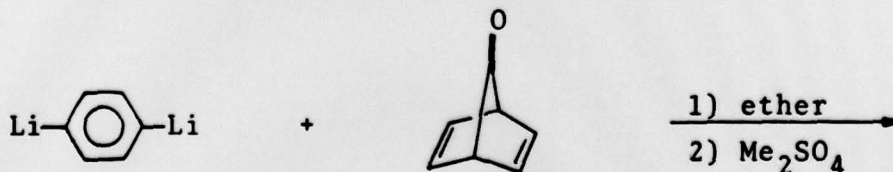
AREAS OF ADVANCEMENT

Preparation of Ligating Monomers

Monomers containing two ligating groups separated by distances greater than that favorable for chelation on one metal center were prepared. These included the following:



Attempts were made to prepare the following cyclopentadienyl monomer from the norbornadienyl precursors:



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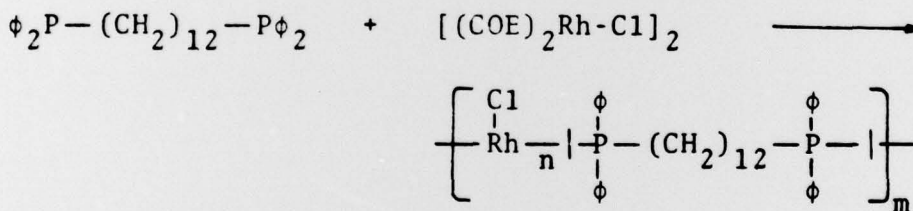
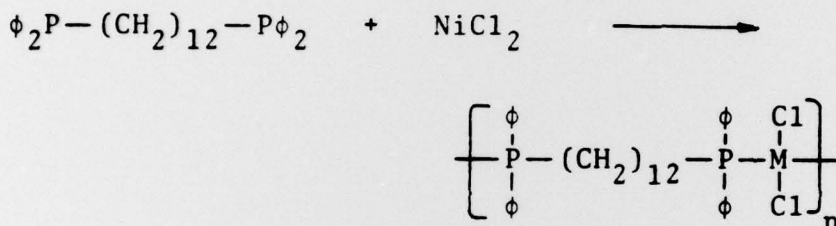
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Good preparations of the ethers were developed, however, clean conversion to the monomer were not achieved due to the lack of time.

### Polymer Formation

Polymers were prepared from the bisphosphine and nickel and rhodium halide salts. These insoluble polymers showed the appropriate analysis and were of the proper color for the desired polymers.



n = 1, 2 or 3; m = large

Further characterization and the development of these materials as catalysts must await further support.

### Polymer Imbeded Metals

Materials can be prepared containing mixed valent metal salts in a variety of polymeric matrices. The most stable of these, polymethylmethacrylate-Pt, was evaluated for the oxidation of sulfides and as an electrode coating.

### Oxidations

The ethanol insoluble material produced from polymethylmethacrylate and  $PtCl_2/MeOH$  was tested for the oxidation of various sulfides at one atmosphere of  $O_2$  and temperatures up to  $60^\circ C$ . None of the sulfides showed any enhanced oxidation rates.

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Electrochemistry of Polymer Coated Electrodes

A preliminary examination of these materials as coatings on graphite electrodes was carried out. These studies suggest that the polymer containing platinum can change the characteristics of a carbon electrode toward those of a standard platinum electrode.